

## Claims

We claim:

1. A valve plug comprising:
  - (A) a valve plug head;
  - (B) a valve plug stem;
  - (C) a valve plug stem base for receiving said valve plug head, wherein said valve plug stem base is fixed to said valve plug stem and
  - (D) a plug head band fitted to said valve plug head.
2. A valve plug, as recited in claim 1, further comprising a retaining ring fixed to said valve plug stem base and adapted to hold said plug head band in place.
3. A valve plug, as recited in claim 1, wherein said valve plug head is composed of a structural ceramic material.
4. A valve plug, as recited in claim 1, wherein said valve plug head is composed of a material selected from the group consisting of structural ceramics, cermets, cast irons, silicon irons, white irons, martensitic steels, CrCoFe alloys, and other metals that are not amenable to welding or brazing.
5. A valve plug, as recited in claim 1, wherein said plug valve stem is composed of a material selected from the group consisting of titanium and its alloys, zirconium and its alloys, niobium and its alloys, titanium-niobium alloys, alloy steels, carbon steels, iron-base superalloys, stainless steels, nickel and its alloys, nickel-base superalloys, copper based alloys, cobalt alloys, cobalt-base superalloys, aluminum and its alloys, magnesium alloys, and tantalum.

- 1 6. A valve plug, as recited in claim 1, wherein said plug head band further  
2 comprises a first side and a second side, wherein said first side is larger than said  
3 second side.
- 4 7. A valve plug, as recited in claim 2, wherein said retaining ring is fixed to said  
5 valve plug stem base by one or more bolts held in place by one or more nut  
6 devices.
- 7 8. A valve assembly comprising:  
8 (A) a first flow path;  
9 (B) a second flow path;  
10 (C) a valve chamber connecting said first flow path to said second flow path;  
11 (D) a valve plug having a plug head, a plug stem and a plug shaft and wherein  
12 said plug head is held to said plug stem by a plug head band fit to said  
13 plug stem; and  
14 (E) an actuator mechanically connected to said plug shaft to position said  
15 valve plug in said valve chamber.
- 16 9. A valve assembly, as recited in claim 8, wherein said plug stem further comprises  
17 a plug stem base that further comprises a cavity for receiving said plug head and a  
18 recess for holding said plug head band.
- 19 10. A valve assembly, as recited in claim 8, wherein said plug head is composed of a  
20 first material and said plug stem is composed of a second material and wherein  
21 said first material is different from said second material.

1 11. A valve assembly, as recited in claim 8, wherein said plug head is fixed to said  
2 plug stem by a fastening means, wherein said fastening means is unfastenable by  
3 removing one or more pins from said plug stem.

4 12. A valve assembly, as recited in claim 8, further comprising a means for sealing  
5 said actuator from said valve chamber.

6 13. A valve plug head retainer comprising:

7 (A) a means for holding a valve plug head to a valve plug stem; and

8 (B) a means for fastening said means for holding to said valve plug stem..

9 14. A valve plug head retainer, as recited in claim 13, wherein said means for holding  
10 further comprises a band in contact with said valve plug head and said valve plug  
11 stem.

12 15. A valve plug head retainer, as recited in claim 13, wherein said means for  
13 fastening further comprises a plurality of bolts, a plurality of nuts, and a plug head  
14 band.

15 16. A valve plug head retainer, as recited in claim 14, wherein said band further  
16 comprises a first side and a second side and wherein said first side is greater in  
17 height than said second side.

18 17. A valve plug head retainer, as recited in claim 13, wherein said means for  
19 fastening further comprises one or more pins.

20 18. A valve plug head retainer, as recited in claim 13, wherein said plug head is  
21 further comprised of a material selected from the group consisting of structural  
22 ceramics, cermets, cast irons, silicon irons, white irons, martensitic steels, and  
23 CrCoFe alloys.

is band  
a means for  
holding or  
fastening

P. 18  
1.7 x 8

092533.02229

1.  
2.  
3.  
4.

19. A valve plug head retainer, as recited in claim 14, wherein said band further comprises a material selected from the group consisting of titanium and its alloys, zirconium and its alloys, niobium and its alloys, titanium-niobium alloys, alloy steels, carbon steels, iron-base superalloys, stainless steels, nickel and its alloys, nickel-base superalloys, copper based alloys, cobalt alloys, cobalt-base superalloys, aluminum and its alloys, magnesium alloys, <sup>and</sup> tantalum.

20. A valve plug head retainer, as recited in claim 13, wherein said band is composed of a first material and said plug head is composed of a second material and where said first material is different from said second material.